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Registration Decision RD2012-09

Carfentrazone-ethyl

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Publications
Pest Management Regulatory Agency
Health Canada
2720 Riverside Drive
A.L. 6604-E2
Ottawa, Ontario
K1A 0K9

Internet: pmra.publications@hc-sc.gc.ca
healthcanada.gc.ca/pmra
Facsimile: 613-736-3758
Information Service:
1-800-267-6315 or 613-736-3799
pmra.infoserv@hc-sc.gc.ca

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Registration Decision for Carfentrazone-ethyl and Quicksilver Herbicide

Health Canada's Pest Management Regulatory Agency (PMRA), under the authority of the *Pest Control Products Act* and Regulations, is granting full registration for the sale and use of Aim (Carfentrazone-ethyl) Technical Herbicide and Quicksilver Herbicide, containing the technical grade active ingredient carfentrazone-ethyl, to control silvery-thread moss in golf course greens and tees.

An evaluation of available scientific information found that, under the approved conditions of use, the product has value and does not present an unacceptable risk to human health or the environment.

These products were first proposed for registration in the consultation document[1] Proposed Registration Decision PRD2011-08, *Carfentarzone-ethyl*. This Registration Decision[2] describes this stage of the PMRA's regulatory process for carfentazone-ethyl and summarizes the Agency's decision and the reasons for it. The PMRA received no comments on PRD2011-08, *Carfentrazone-ethyl*. This decision is consistent with the proposed registration decision stated in PRD2011-08, *Carfentrazone-ethyl*.

For more details on the information presented in this Registration Decision, please refer to PRD2011-08, *Carfentrazone-ethyl*, which contains a detailed evaluation of the information submitted in support of this registration.

What Does Health Canada Consider When Making a Registration Decision?

The key objective of the *Pest Control Products Act* is to prevent unacceptable risks to people and the environment from the use of pest control products. Health or environmental risk is considered acceptable[3] if there is reasonable certainty that no harm to human health, future generations or the environment will result from use or exposure to the product under its conditions of registration. The Act also requires that products have value[4] when used according to label directions. Conditions of registration may include special precautionary measures on the product label to further reduce risk.

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1 "Consultation statement" as required by subsection 28(2) of the *Pest Control Products Act*.

2 "Decision statement" as required by subsection 28(5) of the *Pest Control Products Act*.

3 "Acceptable risks" as defined by subsection 2(2) of *Pest Control Products Act*.

4 "Value" as defined by subsection 2(1) of *Pest Control Products Act*"...the product's actual or potential contribution to pest management, taking into account its conditions or proposed conditions of registration, and includes the product's (*a*) efficacy; (*b*) effect on host organisms in connection with which it is intended to be used; and (*c*) health, safety and environmental benefits and social and economic impact".

To reach its decisions, the PMRA applies modern, rigorous risk-assessment methods and policies. These methods consider the unique characteristics of sensitive subpopulations in humans (for example, children) as well as organisms in the environment (for example, those most sensitive to environmental contaminants). These methods and policies also consider the nature of the effects observed and the uncertainties when predicting the impact of pesticides. For more information on how the PMRA regulates pesticides, the assessment process and risk-reduction programs, please visit the Pesticides and Pest Management portion of Health Canada's website at healthcanada.gc.ca/pmra.

What is Carfentrazone-ethyl?

Carfentrazone-ethyl is a herbicide belonging to the aryl triazolinone chemical family. Carfentrazone-ethyl is rapidly absorbed by plant leaves and works by inhibiting the enzyme protoporphyrinogen oxidase in the chlorophyll biosynthetic pathway, which leads to cell membrane disruption and desiccation resulting in rapid development of chlorotic to necrotic symptoms and ultimately plant death.

Carfentrazone-ethyl is classified as a Group 14 herbicide by the Weed Science Society of America and as a Group E herbicide by the Herbicide Resistance Action Committee.

Quicksilver Herbicide contains the active ingredient carfentrazone-ethyl at 224 grams per litre of product. Quicksilver Herbicide is a post-emergence herbicide, i.e., a herbicide applied after the moss has emerged from the ground, which is applied using ground equipment to golf greens and tees consisting of creeping bentgrass, colonial bentgrass and annual bluegrass for the control of silvery-thread moss (*Bryum argenteum*).

Health Considerations

Can Approved Uses of Carfentrazone-ethyl Affect Human Health?

Exposure to carfentrazone-ethyl may occur through diet (food and water) or when handling and applying the product. When assessing health risks, two key factors are considered: the levels at which no health effects occur and the levels to which people may be exposed. The dose levels used to assess risks are established to protect the most sensitive human population (for example, children and nursing mothers). Only uses for which the exposure is well below levels that cause no effects in animal testing are considered acceptable for registration.

Toxicology studies in laboratory animals describe the potential health effects from varying levels of exposure to a chemical and identify the dose where no effects are observed. The health effects noted in animals occur at doses more than 100-times higher (and often much higher) than levels to which humans are normally exposed when using the carfentrazone-ethyl product according to label directions.

The end-use product, Quicksilver Herbicide, is considered to be chemically and toxicologically equivalent to the currently registered end-use product, Aim EC Herbicide (Reg. No. 28573), with low acute oral, dermal and inhalation toxicity. It is slightly irritating to the eyes and skin and does not cause an allergic skin reaction.

When tested in laboratory animals, carfentrazone-ethyl was not oncogenic, genotoxic or neurotoxic. Animal studies also demonstrated that carfentrazone-ethyl had no effects on reproductive toxicity, developmental toxicity, or teratogenicity. There was no evidence that carfentrazone-ethyl affected the immune and endocrine systems. The toxicity data did not demonstrate an increased sensitivity of the young to the toxic potential of carfentrazone-ethyl when compared to the adult animals

Risks in Residential and Other Non-Occupational Environments

There are no proposed residential uses of Quicksilver Herbicide. Bystanders may come in contact with residues on the skin while golfing on treated golf course tees and greens. This exposure is expected to be much less than that for workers and is considered negligible. Therefore, health risks to bystanders are not of concern.

Occupational Risks From Handling Quicksilver Herbicide

Occupational risks are not of concern when Quicksilver Herbicide is used according to the proposed label directions, which include protective measures.

Workers and custom applicators who mix, load or apply Quicksilver Herbicide as well as workers re-entering freshly treated golf courses can come in direct contact with carfentrazone-ethyl residues on the skin. Therefore, the label specifies that anyone mixing/loading Quicksilver Herbicide must wear a long-sleeved shirt, long pants, chemical resistant gloves and shoes plus socks, and that anyone applying the product must wear a long-sleeved shirt, long pants, and shoes plus socks. The label also requires that workers do not enter treated areas until the spray has dried. Taking into consideration these label statements and the expectation that occupational exposure is to be short-term for workers, the risks to mixers/loaders, applicators and re-entry workers are not a concern.

Environmental Considerations

What Happens When Carfentrazone-ethyl Is Introduced Into the Environment?

When carfentrazone-ethyl is applied for control of weeds in turf, some of it finds its way into soil and water. However, carfentrazone-ethyl is rapidly broken down by soil microbes and by chemical reaction in water, thus, is not expected to persist in the environment. Its major transformation products will be present in soil and aquatic systems for a longer period of time. Laboratory studies indicate that carfentrazone-ethyl and its transformation products are mobile in soil. There is, however, no field evidence that the use of this herbicide will result in groundwater contamination, indicating that leaching in soil is offset by biotransformation processes; therefore, potential for groundwater contamination would be low.

When carfentrazone-ethyl is used for weed control in turf, there is a potential that nontarget plant species on land and in water may be exposed to the chemical as a result of spray drift or runoff. Some plant species are sensitive to the chemical and would be adversely affected. In order to minimize the potential exposure, strips of land (buffer zones) between the treated area and the nontarget terrestrial or aquatic areas will be left unsprayed. The width of these buffer zones will be specified on the product label. Water monitoring data were not available at the time of this review. Carfentrazone-ethyl presents negligible risk to wild birds and mammals, bees and other arthropods.

Value Considerations

What Is the Value of Quicksilver Herbicide?

Quicksilver Herbicide, a post-emergence herbicide, controls silvery-thread moss (*Bryum argenteum*) in golf course greens and tees consisting of established creeping bentgrass, colonial bentgrass and annual bluegrass or consisting of newly seeded, sodded or sprigged creeping bentgrass.

One or more post-emergence applications (maximum of 440 g carfentrazone-ethyl/ha per year) of Quicksilver Herbicide along with a non-ionic surfactant (at 0.25% volume/volume) provides effective control of silvery-thread moss in golf course greens consisting of established creeping bentgrass, colonial bentgrass and annual bluegrass or consisting of newly seeded, sodded or sprigged creeping bentgrass.

Measures to Minimize Risk

Registered pesticide product labels include specific instructions for use. Directions include risk-reduction measures to protect human and environmental health. These directions must be followed by law.

The key risk-reduction measures being proposed on the label of Quicksilver Herbicide to address the potential risks identified in this assessment are as follows.

Key Risk-Reduction Measures

Human Health

Workers and custom applicators who mix, load or apply Quicksilver Herbicide as well as workers re-entering freshly treated golf courses can come in direct contact with carfentrazone-ethyl residues on the skin. Therefore, the label specifies that anyone mixing/loading Quicksilver Herbicide must wear a long-sleeved shirt, long pants, chemical resistant gloves and shoes plus socks, and that anyone applying the product must wear a long-sleeved shirt, long pants, and shoes plus socks. The label also requires that workers do not enter treated areas until the spray has dried. Taking into consideration these label statements and the expectation that occupational exposure is to be short-term for workers, the risks to mixers/loaders, applicators and re-entry workers are not a concern.

Environment

To protect sensitive terrestrial and aquatic plant species from the turf use of carfentrazone-ethyl mitigative measures are recommended. These include adding precautionary statements to the label regarding environmental hazards and the directions for use, as well as a 10 m buffer zone to protect sensitive terrestrial plants from spray drift.

Other Information

The relevant test data on which the decision is based (as referenced in PRD2011-08, *Carfenmtrazone-ethyl)* are available for public inspection, upon application, in the PMRA's Reading Room (located in Ottawa). For more information, please contact the PMRA's Pest Management Information Service by phone (1-800-267-6315) or by e-mail (pmra.infoserv@hc-sc.gc.ca).

Any person may file a notice of objection[5] regarding this registration decision within -- 60 days from the date of publication of this Registration Decision. For more information regarding the basis for objecting (which must be based on scientific grounds), please refer to the Pesticidess and Pest Management portion of the Health Canada's website (Request a Reconsideration of Decision, www.hc-sc.gc.ca/cps-spc/pest/part/protect-proteger/publi-regist/index-eng.php#rrd) or contact the PMRA's Pest Management Information Service.

[5] As per subsection 35(1) of the *Pest Control Products Act.*